

Project Leader's Report

December 2005

Fall in Athens, Georgia

USDA Forest Service - Southern Research Station - 320 Green Street, Athens GA 30602 - <http://www.srs.fs.usda.gov/disturbance>

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Outreach Activities:

• Three organized groups of 84 people visited the Brender Demonstration Forest in November, including the Jones County History and Heritage Club, the Abraham Baldwin Agriculture College Silviculture Class, and a Georgia Pacific master timber harvesting workshop group. A total of 25 people came by the office for information and 51 people hiked the Hitchiti Interpretive Trail. Visitors came from as far away as Largo, Florida.

• An online questionnaire targeted towards gathering information on fuel management issues faced by on the ground fire managers in Florida pine forests was kicked off this month as part of the project funded by a Joint Fire Science grant to Joe O'Brien and Ken Outcalt to develop Best Management Practices guidelines. Already 10 recipients have completed the questionnaire and the results hint at the complexity of issues guiding fuel management practices.



A man and his drip torch.



Technology Transfer:

• Ken Outcalt, Tom Waldrop, and Joe O'Brien attended and presented papers at the Joint Fire Science Program Principal Investigators meeting in San Diego. They talked about "Frequency and season of prescription fires to reduce hazardous fuel loads on the lower Piedmont of Georgia" (poster presented by Ken Outcalt); "Best Management Practices for Fuel Treatments" (paper presented by Joe O'Brien); "Hyperspectral image analysis to identify fuel types in the southern Appalachian Mountains" (paper presented by Tom Waldrop). A highlight of the meeting was when Waldrop and Outcalt and other members of the National Fire and Fire Surrogate study met with the Governing Board of the Joint Fire Science Program. The lunch meeting was designed to discuss immediate and long-term plans for data analysis and future measurements.

• Mac Callaham attended the annual meetings of the Soil Science Society of America, held in Salt Lake City, Utah, in early November. Mac was invited to give a talk in a symposium organized by Dan Richter of Duke University. The symposium was focused on long-term experiments, and Mac gave a presentation on long-term work underway at the Konza Prairie Biological Station where he did his dissertation research. The Southern Research Station was well represented in this special symposium as there were also talks by Jennifer Knoepp (RWU-4351) and Andy Scott (RWU-4111). Another presentation in the session, delivered by Richter, featured results

from the Southern Research Station's Calhoun Experimental Forest, which is managed by the unit.



• While at the SSSA meetings, Callaham also presented a poster authored by Ralph DiCosty, Mac Callaham and John Stanturf on "Atmospheric deposition and re-emission of mercury estimated in a prescribed forest fire experiment in Florida, USA." This poster reports on work at the long-term burning plots on the Osceola National Forest.

• John Stanturf co-authored a paper presented by Felipe Sanchez, SRS-4154, at the Soil Science Society of America annual meeting. The paper, "Soil carbon, after three years, under short rotation woody crops grown under a range of nutrient and water availability," is based on work at the Savannah River Site in South Carolina.

Technology Transfer:



Piedmont National Refuge Staff in training session with Gary Achtemeier on the PB-Piedmont smoke model.

- Gary Achtemeier presented a half-day training session on PB-Piedmont for staff of the Piedmont National Wildlife Refuge (Fish and Wildlife Service) near Grey, Georgia. PB-Piedmont is a smoke modeling program for prescribed burning managers. PB-Piedmont was recently installed at the South Carolina Forestry Commission and will soon be linked to the SHRMC MM5 meso-scale meteorological data for planning prescribed burns, according to Harry Blount, GIS Manager with the SCFC.

- Joe O'Brien instructed Bahamian firefighters on understanding fire regimes and fire ecology as part



Joe O'Brien instructing Bahamian firefighters.



A prescribed burn in a Caribbean pine forest, Abaco Island, The Bahamas.

of wildland firefighter training in Marsh Harbour, sponsored by The Nature Conservancy and the US State Department. He presented two classroom training sessions followed by demonstrations of fire ecology in the field, including a prescribed fire. Bahamian fire bosses, trained last year by the Forest Service-Nature Conservancy team, supervised this fire. The Hon. John Darrell Rood, US Ambassador to the Bahamas, made a surprise visit to the fire. Ambassador Rood was formerly a member of the Florida Fish and Wildlife Commission and recently purchased land in central Georgia where he hopes to restore a longleaf forest. Joe spoke with him about the fire regime of the Abaconian forests and work in restoration of fire into longleaf pine forests. O'Brien took additional measurements of CO₂ and smoke in parrot nest cavities and resurveyed the burn plots from last year. He has been invited to present the results both at the Abaco Science Alliance meeting in January in Marsh Harbour and at the "Bridging the gaps between Florida and the Bahamas" Conference to be held in Miami in February and sponsored by Florida International University, the Nature Conservancy, National Park Service, and Miami-Dade County in Miami.

- Jay Charney of the Eastern Modeling Consortium, Northern Research Station in East Lansing, Michigan, used slides and additional material provided by Gary Achtemeier on the Smoke Management Team's smoke models to present a talk at the "Fire in Eastern Oak Forests" Conference in Columbus, Ohio. Charney reports there was a good level of interest among potential users for PB-Piedmont.

- John Stanturf presented an invited paper on "Restoration of Southern Forested Ecosystems" at the Eastern Forest Restoration Conference, held in Black Mountain, North Carolina and sponsored by the Southern Appalachian Forest Coalition. He also participated in a panel

Technology Transfer:

discussion on how current restoration science can help improve project planning, implementation, and monitoring.



Participants at the symposium honoring Professor David Coleman gathered at Flinchum's Phoenix.

- Mac Callaham was on the organizing committee for a symposium, held in Athens, GA, honoring the career and achievements of Dr. David C. Coleman. Prof. Coleman retired in June 2005 from his position as Distinguished Research Professor at UGA's Institute of Ecology. Coleman's international influence on the discipline of soil ecology was evident throughout the two-day program, as individuals representing 20 different countries gave oral and poster presentations. Callaham also presented a poster, co-authored by John Stanturf and Ralph Boerner (Ohio State University), at this symposium, entitled "Viewing ecosystem restoration through the glass of soil ecology: Making use of the illuminated ped."

- The uplands ecology team traveled to Columbus, Ohio for the Workshop of Fire in Eastern Oak Forests held at Ohio State University. Tom Waldrop presented an invited paper on "Research Efforts on Fuels and Fuel Models in Eastern Hardwood Forests." The meeting was among the first to present research results and management recommendations for fire in hardwood systems. The audience consisted of over 300 managers, administrators, and researchers. Other members of the Uplands Team who attended were Ross Phillips, Greg Chapman, Lucy Brudnak, Eddie Gambrell, Helen Mohr, Mitchell Smith, and Chuck Flint.



Technology Transfer:



Southern Appalachian FFS hardwood site. The photo on previous page shows pre-treatment and photo above is after a mechanical and burn treatment.

• Mac Callaham was a co-author on a paper presented by Nitya Alahari, a graduate student at University of Tulsa, at the 12th International Petroleum Environmental Conference, in Houston, Texas. The paper, “Earthworms as ecoengineers in the restoration of oil and brine-impacted soils following remediation”, describes preliminary results from experimental work in Nitya’s Master’s thesis.

• An article by Yong Liu on global water cycle modeling is included in the first ever *Encyclopedia of Hydrological Sciences*, which was published in October 2005. Wiley Publishing, a leading publisher of scientific and technical information, asked Dr. Yong Liu, USDA Forest Service, and Professor Roni Avissar, Duke University, to contribute to its definitive multi-volume encyclopedia aimed at researchers. Their comprehensive entry about analytical models based on the soil and atmospheric water and energy conservation equations used to model global water cycles will help readers to understand some water cycle variability issues, including timescale, persistence, and major physical parameters and processes.



Meetings/Reports:

• John Stanturf attended the Executive Committee meeting of the Short Rotation Woody Crops Operations Working Group held at the Natural Resources Research Center of the University of Minnesota in Duluth, Minnesota. The group planned the biennial conference to be held in Pasco, Washington next September 25-28. The meeting will be hosted by Boise and Potlatch.

Meetings/Reports:

The group also toured the hybrid poplar fiber farm of International Paper, hosted by Mike Young, Farm Manager. The fiber farm is one of the blocks of property for sale by IP. There are several parties interested in purchasing the farm, which is expected to be announced by the second quarter of 2006.

• Stanturf attended the AD/PM (Assistant Director, Program Manager, and Washington Office Staff) meeting in Coolfont, West Virginia, representing the Forest Service Research Advisory Committee (FSRAC). He presented an update on FSRAC activity that emphasized the work done to clarify the guidance on ethics relating to Forest Service scientists working with outside organizations including universities. There was a great deal of discussion at the meeting about the Washington Office reorganization around eight Strategic Program Areas and how the various “management by objectives” programs favored by the Office of Management and Budget are affecting Agency budgets.

• Tom Waldrop met with Andy Youngblood and Heidi Bigler-Cole of the Pacific Northwest Station. The group is collaborating on a workshop on fuels management for the southern Appalachian Region based on the National Fire and Fire Surrogate Study. Youngblood and Bigler-Cole are studying various methods of technology transfer that are used across the United States and trying to determine which is most successful for communicating with forest managers. The workshop will be held in Asheville, NC on January 24-25, 2006.

Partnerships:

• John Stanturf visited Danny Lee, Director of the Eastern Forest Environment Threat Assessment Center in Asheville. They discussed opportunities for unit scientists to collaborate with the EFETAC, in particular developing baseline information on disturbance regimes in Southern forests.

• Joe O’Brien has been asked by Robert Mitchell of the Joseph W. Jones Ecological Research Center at Ichauway to help organize and participate in a regional workshop sponsored by the National Commission on Science for Sustainable Forestry. The workshop will focus on understanding the role of both historical and future ranges of ecosystem variability and how this knowledge can guide management. The project stems from the heavy reliance on historical information when creating and implementing management goals. Since in most areas of the country, the current landscape differs greatly in many ways from the landscape of the past, using historical conditions as targets can be impractical or impossible. The

Partnerships:

result is often a diffuse management target usually referred to as reestablishing “natural” conditions. Careful consideration of the impacts of specific ecological factors and how they affect specific management targets will be discussed among an audience of both scientists and managers. The goal will be to redirect the focus away from fuzzy management goals to focusing on concrete goals and the science needed to reach those goals. The workshop tentatively is scheduled for April 2006.

• Tom Waldrop met with Steven Jeffers of Clemson University to discuss their collaboration on studies of pathology on the Piedmont and Appalachian sites of the National Fire and Fire Surrogate Study. The two are beginning a new study on the Appalachian site to study the causes of delayed hardwood mortality that has been observed in several of Waldrop’s studies in the region.

Funding:

• The unit received its FY 2006 allocation for National Fire Plan funding of \$1.754 million. This includes \$400,000 of Hazardous Fuels funding.

• Scott Goodrick submitted a proposal to NASA “Application of artificial neural networks to integrate remote sensing data into the National Fire Danger Rating System.” The three-year proposal requests \$853,897 to improve the spatial quality of the Energy Release Component information, as well as forecasting its variation on a monthly time-scale.

• A proposal “Integrating NASA EOS and NPP Remote Sensing Measurements into CMAQ/SMOKE/BlueSky Modeling Systems (RS-CSB)” was submitted to NASA by researchers at George Mason University. Gary Achtemeier and Yong Liu were co-PIs. This proposal is to integrate satellite remote sensing measurements made by the NASA Earth Observing System (EOS), and in the future, the National Polar-Orbiting Operational

Personnel News:

• Dale Wade, retired research forester in the unit, has been elected a Fellow of the Society of American Foresters. Congratulations, Dale!

• John Stanturf has been appointed the U.S. Representative to the International Poplar Commission, with the concurrence of the FAO.

Personnel News:

- Mac Callaham has been invited to serve on the Editorial Advisory Board of *Applied Soil Ecology* for an initial term of 3 years.
- Congratulations to Deb Kennard, former Research Ecologist, on the birth of her daughter. Also to Cathy Cook on the birth of her daughter, Caitlin Marie. Cathy is in SRS-4505 in Athens.
- Congratulations to Gary Achtemeier on becoming a grandfather twice-over. Onya Grace Barkley was born to daughter Cheryl Barkley on November 23, weighing in at 8lbs 4 oz and 20 inches long. Remember Gary, your kids are growing old, you are just getting better!
- If the rumors are true, congratulations to Ken Cordell, Project Leader of SRS-4901, on his promotion to ST (the equivalent of GS-16). The Forest Service now has 10 ST-level scientists; more on this in the December PL Report.



Gary Achtemeier and new granddaughter Onya Barkley.

From the Cover (Masthead) - Ginkgo tree (*Ginkgo biloba*) located outside Forestry Sciences Laboratory, Athens, GA.



News from Around the Region:



• Jim Hubbard was named Deputy Chief for State and Private Forestry. He is currently the Director of the Office of Wildland Fire Coordination with the Department

of Interior (DOI) where he oversees the implementation of the National Fire Plan and the activities of five land managing bureaus at DOI for forest fire prevention, mitigation, and partnerships with communities, tribes, and stakeholders. Prior to his position at DOI, Hubbard was with the Colorado State Forest Service for over 34 years and served as State Forester from 1984-2004. He has been a leader in the National Association of State Foresters (NASF) and chaired the Council of Western State Foresters. Hubbard holds a Bachelor of Science degree in Forest Management from Colorado State University.

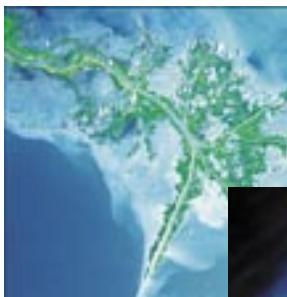
- Christopher Pyron, Deputy Chief for Business Operations, has announced his intention to retire effective January 2006.

Terra Satellite's Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER). Visitors can browse the images by continent or alphabetically. The images support information about rock outcrops, deserts, deltas, clouds, glaciers, and many other earth science topics. The website allows users to download the images as posters and wallpaper. <http://www.earthasart.gsfc.nasa.gov/index.htm>

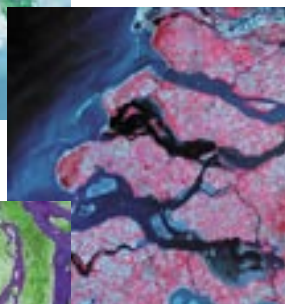
- Global investment in renewable energy hit a record US\$30 billion last year, accounting for 20% to 25% of all investment in the power industry, with solar power the fastest-growing energy technology, according to a WorldWatch Institute report. *Renewables 2005 Global Status Report*; download the 904 kb report at <http://www.worldwatch.org/brain/media/pdf/pubs/ren21/ren21-2.pdf>. A recent analysis of the development of biomass-based energy development in Europe suggests even greater reliance on biofuels in the future (Andre P. C. Faaij. 2005. Bio-energy in Europe: changing technology choices. *Energy Policy* 34: 322-342). Bio-energy is seen as one of the key options to mitigate greenhouse gas emissions and substitute for fossil fuels. Over the past 10-15 years in the European Union, use of biomass in providing heat increased 2% annually between 1990 and 2000 and increased 9% annually in electricity production over the same period. Biofuels production increased about eight-fold in the same period. Biomass contributed some two-thirds of the total renewable energy production in the European Union (EU) (2000 PJ) or 4% of the total energy supply in 1999. Given the targets for heat, power and biofuels, this contribution may rise to some 10% (6000 PJ) by 2010. National policy programs proved to be of vital importance for the success of the development of bio-energy, which led to very specific technological choices in various countries. For the future, a supra-national approach is desired: comprehensive research and development, demonstration and deployment trajectories for key options such as biomass integrated gasification/combined cycle and advanced biofuels concepts, an international biomass market allowing for international trade, and an integrated policy for bio-energy that incorporates policies for energy, agricultural, forestry, waste and industrial development. The Common Agricultural Policy of the (extended) EU should fully incorporate bio-energy and perennial crops in particular. (Source: Edited abstract).

- As reported by Katherine Adraneda in The Philippine Star, various environment non-government organizations (ENGOS) have launched a national movement to restore at least one million hectares of the country's rainforest by

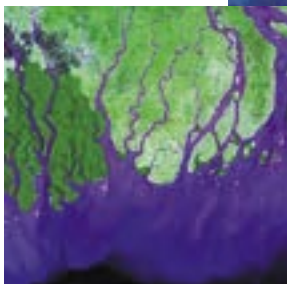
Examples of river deltas.



Mississippi River, USA



Rhine-Scheldt, The Netherlands



Ganges, India

- The US Geological Survey and NASA have teamed up to bring the public images of the Earth taken by the Landsat-7 satellite and the



Rainforest in the Philippines.

2020. They raised the alarm over the continuing rapid rate of destruction of the country's forests, which they predicted may dwindle to 320,000 hectares of primary forest, or just 6% of the country's total land area, by 2010. The Haribon Foundation and Rainforest Restoration Initiative (RFRI) would serve as the core group of the social movement, dubbed as ROAD 2020, which would be supported by the Netherlands government. The ROAD 2020 would only use native tree species. Haribon data showed that in 1899, the country's forest cover was estimated at 21 million hectares, or 70 % of the country's total land area. Haribon attributes the significant reduction of the country's forest cover to deforestation and degradation activities such as persistent logging and kaingin (slash-and-burn farming), among other factors. (Source: The Philippine Star, November 21, 2005).

- Global investment bank Goldman Sachs has adopted a comprehensive environmental policy, acknowledging the scientific consensus on climate change and calling for urgent action by public policy makers and federal regulators to reduce greenhouse gas emissions. The policy is also the first in the financial sector to acknowledge the degradation of global "ecosystems services" addressed in the United Nations' Millennium Ecosystem Assessment. Goldman Sachs will establish and fund a Center for Environmental Markets in partnership with academia and civil

society. The center will engage in research to develop public policy options for establishing markets around climate change, biodiversity conservation and ecosystem services. As a major owner and operator of fossil fuel-fired power plants in the United States, Goldman Sachs has agreed to publicly report and work to reduce greenhouse gas emissions from its plants while also supporting the need for a national policy to limit greenhouse gas emissions. The policy states that its investment businesses will "take the lead in identifying investment opportunities in renewable energy" and that it will "be a leading U.S. wind energy developer and generator." It further promises to promote green building standards such as LEED Gold and Forest Stewardship Council (FSC) certification. (Source: GreenBiz.com)

- Australian researchers have identified vegetation-specific root: shoot ratios whose use is likely to substantially improve the accuracy of root biomass estimates for purposes such as carbon accounting and studies of ecosystem dynamics. When the root: shoot ratio data collated in their study, reported in *Global Change Biology*, were applied to an analysis of the global carbon budget, there was a 50% increase in estimated global root carbon stock, and a 12% increase in estimated total carbon stock of trees and other plants. The improvements in accuracy and increases in estimates of carbon in plants could increase the value of forests as carbon sinks and provide more-robust data that could underpin carbon trading. Although a single allometric equation derived in this study reliably predicted root biomass from shoot biomass for forests and woodlands, in general, the use of vegetation-specific root: shoot ratios was found to be a more accurate method for predicting root biomass. (Karel Mokany, R. John Raison, Anatoly S. Prokushkin. 2005. Critical analysis of root: shoot ratios in terrestrial biomes. *Global Change Biology* 11.)

- The Global Land Project was launched at the 6th Open Meeting of the Human Dimensions of Global Environmental Change Research Community held in Bonn, Germany. The Global Land Project is a significant step for the development of integrated scientific approaches to coupled-human environment systems. The Project is co-chaired by Dennis Ojima from Colorado State University, a renowned earth system and carbon cycle scientist, and Richard Aspinall, from Arizona State University, a leading geographer and spatial analyst. It is jointly sponsored by the International Human Dimensions Program and the International Geosphere-Biosphere Program. Included in the science plan are the questions "How do changes

in ecosystem structure and functioning affect the delivery of ecosystem services?" and "How are ecosystem services linked to human well-being?" Carbon management is one of the six major cross-cutting themes in the Global Land Project. Further details are available at <http://www.glp.colostate.edu>

- Although the United States federally is not restricting greenhouse gas emissions, local laws limiting emissions have the potential for global impact. Legislation limiting emissions implemented by local governments and states affect between 9% and 17% of the global economy, according to a study published in *Nature* (Fisher, B., Costanza, R. 2005. Environmental policy: Regional commitment to reducing emissions. *Nature* 438: 301-302). Nevertheless, Reuters reports that a group of northeast states has postponed the announcement of the Regional Greenhouse Gas Initiative, a landmark agreement to limit greenhouse gas emissions from power plants, after Massachusetts Governor Mitt Romney raised objections to the pact. An earlier study



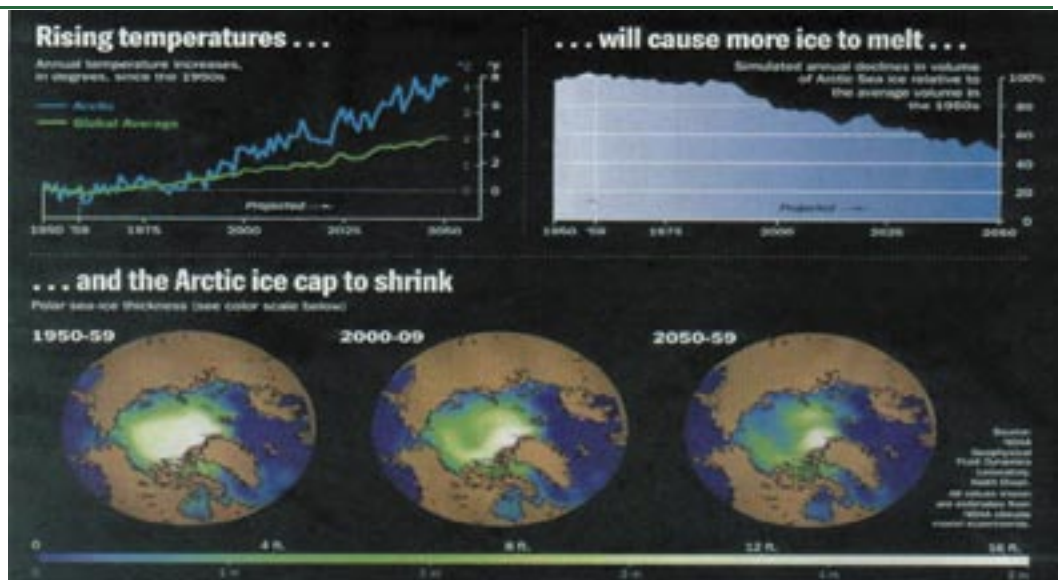
sponsored by the nine northeast states planning to cut greenhouse emissions from electricity generation indicated the proposal would raise electricity rates only between 0.3% and 6.9% rather than the 23% contended by an opposing business group. (Source: eCarbon News, a newsletter of the Cooperative Research Centre for Greenhouse Accounting)

Global warming is doubling the rate of sea level rise around the world, but attempts to stop it by cutting back on greenhouse gas emissions are likely to be futile, leading researchers warn. The oceans will rise nearly half a meter by the end of the century, forcing coastlines back by hundreds of meters, the researchers claim in a recent article in *Science* (Miller, K.G. et al. 2005. The Phanerozoic record of global sea-level change. *Science* 310. (5752): 1293 – 1298). Insurance companies are beginning to pay attention to these predictions: The Guardian reports that one of Britain's biggest insurers, Royal & Sun Alliance, has warned that the number of homes at risk from flooding through climate change is double the number previously thought, and that unless the government takes urgent measures to improve flood defenses, it will consider withdrawing insurance coverage. Munich Re,



News from Around the Region:

the world's largest re-insurer, has issued a 110 million euro (\$129 million) bond to cover losses in the event that global warming fuels a rise in storms in Western Europe, according to Reuters. Meanwhile, researchers at the Tyndall Centre for Climate Change Research, in partnership with the UK Overseas Territories, have produced a guidebook on *Surviving Climate Change in Small Islands*. The guidebook provides information about the risks associated with climate change, as well as providing ideas, tools and techniques for those who need to begin taking action now to prepare. It is primarily aimed at government officers, and has been written to facilitate incorporation of climate change into planning and development activities on small islands. The guidebook (1.36 MB pdf) can be downloaded at <http://www.tyndall.ac.uk/publications/surviving.pdf>



September 4, 1990 Time Magazine presents new data and a new view of global warming together with figures from NOAA research.



Chuck Flint and Lucy Brudnak are learning to identify species of hardwood fuels in the winter. Winter will soon be here.

FY 2006 Publications (* denotes new publication this month)

Refereed Journals and Book Chapters

Jordan, L., Daniels, R.F., Clark, A. III, He, R. 2005. Multilevel nonlinear mixed-effects models for the modeling of earlywood and latewood microfibril angle. *Forest Science* 51(4): 357-371.

Liu, Y.-Q. 2005. Land breeze and thermals: A scale threshold to distinguish their effects. *Advances in Atmospheric Science*, Vol. 22, No. 6, 889-902

Liu, Y.-Q., Fu, R., Dickinson, R. 2005. Smoke aerosols altering South American monsoon. *Bulletin American Meteorological Society* 86(8): 1062-1063.

***Liu, Y.-Q., Avissar, R.** 2005. Modeling of the global water cycle - analytical models. In M. G. Anderson, Ed. *Encyclopedia of Hydrological Sciences*. John Wiley & Sons, pp. 3456.

***Logan, S.R., Edwards, M.B., Shiver, B.D.** 2005. Survival and growth of seed trees 20 years after a natural regeneration cut in the Piedmont of Georgia. *Southern Journal of Applied Forestry* 29(4): 173-178.

Qu, J., Hao, X., Yang, R., Sommers, W., Dasgupta, S., Bhoi, S., Kafatos, M., **Liu, Y.-Q., Achtemeier, G., Riebau, A.R., Coronado, P.** 2005. Bridging Earth observations: remote sensing measurements, fire modeling, and air quality decision support system in the eastern United States. *Earth Observation Magazine* 14 (6).

Reitz, R. 2005. Forests and people: The symbiotic relationship. Pp. 89-93 *In American Perspectives on the Wildland/Urban Interface. The National Wildland/Urban Interface Fire Program*; 113 p.

Rhy, Soung-Ryoul, Chen, Jiquan, Crow, Thomas R., **Saunders, Sari. C.** 2004. Available fuel dynamics in nine contrasting forest ecosystems in North America. *Environmental Management* Vol. 33, Supplement 1, pp. 87-107.

Saunders, S.C., J. Chen, T.D. Drummer, E.J. Gustafson, and K.D. Brosofske. 2005. Identifying scales of pattern in ecological data: A comparison of lacunarity, spectral and wavelet analyses. *Ecological Complexity* 2: 87-105.

Schulte, Lisa A. and Mladenoff, David J. 2005. Severe wind and fire regimes in northern forests: Historical variability at the regional scale. *Ecology*, 86(2): 431-445.

Varner, J.M. III, Gordon, D.R., Putz, F.E., Hiers, J.K. 2005. Restoring fire to long unburned *Pinus palustris* ecosystems: Novel fire effects and consequences for long-unburned ecosystems. *Restoration Ecology* 13(3): 536-544. (Unit funded under agreement #02-1A-11330136-030; funding source Joint Fire Sciences Program)

Proceedings and Reports

Brockway, D.G., **Outcalt, K.W., Tomczak, D.J., Johnson, E.E.** 2005. Restoration of longleaf ecosystems. USDA Forest Service Southern Research Station General Technical Report SRS-83, Asheville, NC; 34 pp.

Kennard, D, Fowler, C. T., Hubbard, W. and Rauscher, M. 2005. The Encyclopedia of Southern Fire Science. In: Kush, J.S., comp., *Longleaf Pine: Making Dollars and Sense*, Proceedings Fifth Longleaf Alliance Regional Conference, 2004 October 12-15, Hattiesburg, MS, Longleaf Alliance Report No. 8: 97-100. (SRS-4104-6009)

Liu, Y.-Q. 2005. Spatial relationships between SST and U.S. Wildfires, *Proceedings of the Sixth Fire and Forest Meteorology Symposium*, 25-27 October 2005, Canmore, AB, Canada, Paper 6.2, P1-6 (available in CD). http://ams.confex.com/ams/6FireJoint/techprogram/programexpanded_302.htm

Outcalt, K.W. 2005. Restoring structure and composition of longleaf pine ecosystems of the Gulf Coastal Plain. In: Kush, J.S., comp., *Longleaf Pine: Making Dollars and Sense*, Proceedings Fifth Longleaf Alliance Regional Conference, 2004 October 12-15, Hattiesburg, MS, Longleaf Alliance Report No. 8: 97-100. (SRS-4104-6009)

Outcalt, K.W. 2005. National Fire and Fire Surrogate Study, 7th Annual SMIC Meeting and Field Trip. October 2005. Solon Dixon Forestry and Education Center, Andalusia, AL [Report]

Outcalt, K.W. 2005. National Fire and Fire Surrogate Study, Fuels Treatment Workshop and Field Trip. October 2005. Solon Dixon Forestry and Education Center, Andalusia, AL [Report]

Schoenholtz, S.H., **Stanturf, J.A.,** Allen, J.A., Schweitzer, C.J. 2005. Afforestation of agricultural lands in the Lower Mississippi Alluvial Valley: The state of our understanding. pp. 413-432. In L.H. Fredrickson, S.L. King, and R. M. Kaminski, eds. *Ecology and Management of Bottomland Hardwood Systems: The State of our Understanding*. University of Missouri-Columbia. Gaylord Memorial Laboratory Special Publication No. 10. Puxico, MO.

Other Publications

Outcalt, K.W. 2005. Prescribed Burning Research in the Piedmont of Georgia. Demonstration Forest Project Hitchiti Experiment Forest, Jarrell, GA. [3-Panel Outdoor Display]

Outcalt, K.W. 2005. Prescribed Burning Research on the Hitchiti Experimental Forest. Demonstration Forest Project Hitchiti Experiment Forest, Jarrell, GA. [Information Card]

Outcalt, K.W. 2005. Long-term Dormant-Season Burning Study Located in the Palmetto/Gallberry Fuel Complex. Demonstration Forest Project Osecola National Forest, Olustee, FL. [Outdoor Display]

Outcalt, K.W. 2005. We can't keep fire out of these woods. We can only choose between prescribed burns or wildfire. Demonstration Forest Project Osecola National Forest, Olustee, FL. [Outdoor Display]

Outcalt, K.W. 2005. We can't keep fire out of these woods. We can only choose between prescribed burns or wildfire. Demonstration Forest Project Osecola National Forest, Olustee, FL. [Information Card]

Outcalt, K.W. 2005. Fire and Fire Surrogate Study in the Gulf Coastal Plain. October 2005 Solon Dixon Forestry and Education Center, Andalusia, AL [Bookmark]

Outcalt, K.W. 2005. Fire and Fire Surrogate Study in the Southern Coastal Plain. October 2005 Myakka River State Park, Sarasota, FL [Bookmark]

Abstracts and Posters

Achtemeier, Gary L., and Luke Naeher. 2005. Measurements of ground-level PM_{2.5} concentrations downwind from Southern prescribed burns. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Poster]

Achtemeier, Gary L. 2005. On plume rise – matching Daysmoke with Briggs Equations for industrial stacks. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Abstract]

*Alahari, N., Sublette, K., Jennings, E., Thoma, G., Wolf, D., Duncan, K., **Callaham, M. Jr.**, Todd, T. 2005. Earthworms as ecoengineers in the restoration of oil and brine impacted soils following remediation. International Petroleum Environmental Conference, November 2005, Houston, Texas [Abstract]

Callaham, M.A., Richter, D.D., Hofmockel, M. 2005 Long-term land use effects on soil invertebrate communities in Southern Piedmont soils. Ecological Society of America annual meeting, 8-11 August, Montréal, Canada [Poster]

***Callaham, M.A., Jr., Stanturf, J.A.**, Boerner, R.E.J. 2005. Viewing ecosystem restoration through the glass of soil ecology: Making use of the illuminated ped. Symposium Honoring Dr. David C. Coleman, 28-29 October, Athens, Georgia [Poster]

***Callaham, M.A. Jr.**, Todd, T.C., Kitchen, D.J., Blair, J.M., Williams, M.A., Rice, C.W. 2005. Long-term studies on soils and soil biology in a Kansas tallgrass prairie: Stories that only time can tell. Invited symposium presentation at the Soil Science Society of America Annual Meeting, 6-10 November, Salt Lake City, Utah [Abstract]

Canfield, J.M., Linn, R., Cunningham, P., **Goodrick, S.L.** 2005. Modeling effects of atmospheric stability on wildfire behavior. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Abstract]

Cunningham, P., **Goodrick, S.L.** 2005. High-resolution numerical model simulations of fire plume dynamics. 2005. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27 Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Poster]

***DiCosty, Ralph J., Callaham Jr., Mac A., Stanturf, John A.** 2005. Atmospheric deposition and re-emission of mercury estimated in a prescribed forest fire experiment in Florida, USA. Soil Science Society of American Annual Meeting, 6-10 November, Salt Lake City, Utah [Poster]

Goodrick, S.L. 2005. Building historical gridded weather data sets for fire program analysis. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Poster]

Goodrick, S.L., Cunningham, P. 2005. A mechanism for the formation of transverse horizontal vortices on wildland fires. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Abstract]

Goodrick, S.L., Hanley, D.E. 2005. Atmospheric teleconnections and wildfires in the southeastern United States. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Poster]

Hanley, D.E., Cunningham, P., **Goodrick, S.L.** 2005. The interaction between a wildfire and a sea-breeze front. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Poster]

Linn, R.R., Canfield, J., Winterkamp, J., Cunningham, P., Colman, J., Edminster, C., **Goodrick, S.L.** 2005. Numerical simulations of fires similar to those of the international crown fire modeling experiment. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Abstract]

Liu, Y.-Q., G. Achtemeier and S. Goodrick. 2005. CMAQ-Daysmoke as a Smoke and Air Quality Management Technique: A Case Study of a Prescribed Burning in Georgia. In: Proceedings Sixth Fire and Forest Meteorology Symposium, October 25-27, Canmore, AB, Canada [Abstract]

Outcalt, K.W., Wade, D. 2005. Response of a mixed longleaf (*Pinus palustris*) and loblolly pine (*Pinus taeda*) community to long-term dormant season prescribed burning. Ecological Society of America annual meeting, 8-11 August, Montréal, Canada [Poster]

***Outcalt, K.W.** 2005. Frequency and season of prescription fires to reduce hazardous fuel loads on the lower Piedmont of Georgia. In: Proceedings of the Annual Joint Fire Science Program Principal Investigator Workshop, November 1, San Diego, California. [Poster]

*Sanchez, Felipe, Coleman, M., Garten, C.T., Luxmoore, R., **Stanturf, J.A.**, Wullschlegel, S.D. 2005. Soil carbon, after three years, under short rotation woody crops grown under a range of nutrient and water availability. Soil Science Society of American Annual Meeting, 6-10 November, Salt Lake City, Utah [Abstract]

Stanturf, J.A., Burbridge, P.R., Gardiner, E.S., Perdue, J.H. 2005. Disturbance in the face of climate change: Incorporating disturbance into management of coastal forests. International Workshop on the Scale of Natural Disturbances from Tree to Stand; 29 September to 1 October, Palanga, Lithuania; Lithuanian Forest Research Institute, Kaunas, Lithuania. [Abstract]



Upcoming Events:

2005		May 21-24	Challenges in Coastal Hydrology and Water Quality, Baton Rouge, Louisiana; http://www.cee.lsu.edu/facultyStaff/Singh_Vejay/index.html
Dec 5-10	Forest Ecosystems in the Caribbean: Ecology to Development (from Basic Knowledge to Sustainable Management), Martinique, West Indies	*Jun 3-8	12th International Symposium on Society and Natural Resource Management, Vancouver, BC, Canada; http://www.issrm2006.rem.sfu.ca
Dec 5-7	Frontiers in Forest Information: a centenary conference/workshop at St Anne's College, Oxford, United Kingdom; www.plantlib.ox.ac.uk/forestry	Jun 5-9	Fourth International Poplar Symposium, "Meeting the Needs of a Growing World through Poplar and Willow Science: Combining Traditional and Novel Approaches in the Genomic Era," Nanjing, China, IUFRO Poplar and Willow Working Party 2.08.04; http://ips2006.njfu.edu.cn/
Dec 6	South Florida Interagency Fire Management Council Meeting, Brighton, FL. Outcalt to attend and present.	Jul 18-20	Advances in Threat Assessment and Their Application to Forest and Rangeland Management, Boulder, Colorado; http://www.forestencyclopedia.net/encyclopedia/threats
Dec 6-9	4th USGS Wildland Fire Science Workshop, Westward Look Resort, Tucson, AZ http://www.ag.arizona.edu/srnr/usgs	Jul 9-15	18th World Congress of Soil Science, in Philadelphia, PA http://www.18wcss.org
Dec 13-14	Sharkey Restoration Site Collaborators Planning Meeting, Stoneville, MS; Stanturf to attend	Aug 6-11	Eighth International Conference on Mercury as a Global Pollutant Madison, WI; http://www.mercury2006.org/ ; DiCosty to attend and present paper
Dec 19	Georgia Air Policy Symposium; Achtemeier to attend and present	Aug 8-10	Forest and Water in a Changing Environment Beijing, China; Chinese Academy of Forestry, Beijing Forestry University and Southern Research Station.
2006		Aug 22-25	5th European Conference on Ecological Restoration: "Land use changes in Europe as a challenge for restoration ecological, economical and ethical dimensions" University of Greifswald, Germany http://www.uni-greifswald.de/SER2006
Jan 24-25	"Fire and Fire Surrogate Treatments for Fuel Reduction in Eastern Hardwood Forests – A Workshop for Land Managers," Asheville, NC; contact Tom Waldrop	Sep 25-28	2006 biennial meeting Short Rotation Woody Crops Operations Working Group, Red Lion Inn, Pasco, Washington; tentatively, joint meeting with Poplar Council of Canada, US Poplar Council, IUFRO Temperate Short Rotation Forestry Working Party 1.03.02, and SAF Agroforestry Working Group;
Jan 29-Feb 2	American Meteorological Society Annual Meeting, Atlanta, GA; http://www.ametsoc.org/meet/annual/	*Sep 26-19	Patterns and Processes in Forest Landscapes; Consequences of Human Management, University of Bari, Italy; IUFRO 8.01.03 Landscape Ecology; http://www.greenlab.uniba.it/events/iufro2006/
Jan 8-12	"Ecology in an Era of Globalization: Challenges and Opportunities for Environmental Scientists in the Americas," Merida, Yucatan, Mexico; www.esa.org/mexico	Oct 10-13	Conference on "Sustainable Forest Management with Fast Growing Plantations", Charleston, SC; contact Dave Wear dwear@fs.fed.us
*Feb 8-12	Pine Rockland Conference, Miami, FL & Marsh Harbour, Bahamas; Outcalt and O'Brien to attend	Oct 25-29	Society American Foresters Annual Meeting, Pittsburgh, PA
Feb 27-Mar 1	Central Hardwood Forest Conference, Knoxville, TN. http://fwf.ag.utk.edu/central/	Oct 23-27	Knowledge management in forestry conference, sponsored by KnowForAlp, hosted by Forest Research Institute Baden Württemberg, Freiburg, Germany
Feb 28-Mar 2	North Carolina Wildland Fire Symposium, Greensboro, NC; http://www.ncfirewise.org	Nov 12-16	Soil Science Society of American Annual Meeting, Indianapolis, IN; http://www.indy.org
Mar 8-9	Wildland Fire 2006, Phoenix, Arizona; http://www.iafc.org/wildland	Nov 13-17	3rd International Fire Ecology and Management Congress, San Diego, CA; http://emmfs.wsu.edu/firecongress/
Mar 24-25	The Seventh Eastern Old-Growth Forest Conference, Little Rock, Arkansas; pre-registration will be required. http://www.srs.fs.usda.gov/4106/meetings/EOGC2006/EOGC2006.htm		
March 27-30	"Fuels Management -- How to Measure Success" conference sponsored by the International Association of Wildland Fire (IAWF), Portland, OR; www.iawfonline.org		
Mar 29-Apr 2	American Society Environmental History Annual Meeting, St. Paul, Minnesota; http://www.h-net.org/~environ/ASEH/conferences.html		
Apr 6-7	Southern Regional Conference on Forestry Technology Transfer and Science Delivery, San Antonio, Texas		
Apr 8-12	International Conference on Hydrology and Management of Forested Wetlands, New Bern, North Carolina; http://www.asae.org/imis/meeting/forestcall.cfm		

Upcoming Events:

Pine Rockland Conference 2006
 “Bridging the Gaps between Florida and the Bahamas”



2007

- Feb 26-Mar 1 14th Biennial Southern Silvicultural Research Conference, Athens, GA;
- Summer 6th North American Forest Ecology Workshop, to be held in British Columbia
- Oct 24-28 Society American Foresters Annual Meeting, Portland, OR.
- Nov 4-8 Soil Science Society of American Annual Meeting, New Orleans, LA; <http://www.neworleanscvb.com>

2008

- Nov 5-9 Society American Foresters Annual Meeting, Reno, NV.

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GPRA -Accomplishment

Category	FY 2004 Total	FY 2005 Total	FY 2006 To Date
Number of Refereed Journal Publications	20	21	11
Number of Non-Refereed Publications (include abstracts)	89	60	26
Number of Publications (refereed + non-refereed)	109	81	37
Number of Tours	41	40	15
Number of Short Courses/Training	20	13	6
Number of Invited Presentations to Scientific Organizations	12	7	10
Number of Invited Presentation to Lay Organizations	30	32	8
Volunteer Presentations to Scientific Organizations (non-GPRA	42	50	13
Number of Technology Transfer Activities (other than above)	105	132	42
Outside Funding	\$2,610,574	\$3,688,734	\$1,754,000

SRS-4104 Project Leader's Report

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 Patricia A. Outcalt - Production, Design and Layout

